CHEM 2800 A/ATU (Winter 2025)

Fundamentals for Environmental Chemistry

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

Course Instructor: Edward Lai

How to address me: Dr. Lai

Email: EdwardLai@Cunet.Carleton.Ca

Best Ways to be in Touch: If you have or question or would like to talk with me, you can approach me after lecture, send an email, or make an appointment to meet my lecture TA during the student (tutorial) hour.

Student (Tutorial) Hour:
Monday 6:05 pm – 6:55 pm
TB 240

Office Location: Steacie Building

Class Location: Please check Carleton Central for room location.

Class Times: Tuesday and Thursday
11:35 am – 12:55 pm

Lab Time: Three hours a week

Department: Chemistry

Lab Coordinator:

Dr. Daniel Sun

XunSun@CUNET.CARLETON.CA

Lecture TA (and marker):
Amos Onomhante
AmosOnomhante@cmail.carleton.ca

Modality: For all lectures of this course, learning will be in person and synchronous. Blended learning will be included, where the instructor combines in-person instruction with online learning activities, to require that students complete some components online.

Course website: Brightspace will be used. Please visit Brightspace on the Carleton University website https://brightspace.carleton.ca/d2l/home/220705 for course announcements, tutorial schedule, assignments, recorded lectures, and learning activities/exercises.

Topics Covered and Learning Outcomes

Inclusive Teaching Statement:

- I am committed to fostering an environment for learning that is inclusive for everyone regardless of gender identity, gender expression, sex, sexual orientation, race, ethnicity, ability, age, class, etc.
- All students in the class, the course TA, and the instructor should be treated with respect during all interactions.

Course Description:

A basis of chemistry needed to understand the environment: composition of the atmosphere and natural waters; equilibrium; surface properties; kinetics and spectroscopy; physical and chemical properties of chemicals in the environment. Limited enrolment course. Priority is given to students in Environmental Science/Engineering.

Lectures three hours a week, laboratory three hours a week.

Prerequisites: CHEM 1006 with a minimum grade of B- or CHEM 1002, or CHEM 1101, (MATH 1007 or MATH 1004).

Topics to be Covered:

Week 1	January 7 and 9	Chapter 1	Environmental chemistry – a global perspective
Week 2	January 14 and 16	Chapter 2	The earth's atmosphere
Week 3	January 21 and 23	Chapter 3	Stratospheric chemistry – ozone (up to p. 49)
Week 4	January 28 and 30	Chapter 3	Midterm test 1 (January 30th, Thursday) in TB 240 via Brightspace, 80 min, from 11:35 am - 12:55 pm. Please bring your own laptop.
Week 5	February 4 and 6	Chapter 3	Stratospheric chemistry – ozone (p. 49-72)
Week 6	February 11 and 13	Chapter 4	Tropospheric chemistry – smog
Week 7	February 17-21	Winter Break. No classes.	
Week 8	February 25 and 27	Chapter 6	Atmospheric aerosols – particulate emissions
Week 9	March 4 and 6	Chapter 6	Midterm test 2 (March 6th, Thursday) in TB 240 via Brightspace, 80 min, from 11:35

			am to 12:55 pm. Please bring your own laptop.
Week 10	March 11 and 13	Chapter 12	Organic matter in water
Week 11	March 18 and 20	Chapter 14	Environmental chemistry of colloids and surfaces
Week 12	March 25 and 27	Chapter 16	Water pollution and treatment chemistry
Week 13	April 1 and 3	Chapter 20	Toxic organic chemicals
	April 11-26		Final exam (to be formally scheduled) via Brightspace, 150 min. Please bring your own laptop.

Important dates and deadlines can be found here: https://carleton.ca/registrar/registration/dates/academic-dates/, including class suspension for fall, winter breaks, and statutory holidays.

Course Level Learning Outcomes:

1. Students will be well informed about many important environmental impacts on human health.
2. Students can use fundamental concepts in first-year chemistry (e.g. thermodynamics, kinetics, and free radical reactions) to describe phenomena in the atmosphere, aquatic ecosystem, and terrestrial landscape.
3. At the end of this course, students will be able to demonstrate a solid knowledge of chemical principles as applied to various fundamental environmental phenomena in air, land, and water.
4. Given reliable scientific information, students can draw independent and educated conclusions about major environmental issues including ozone depletion.

Assessments

Assignments:

Questions and problems will be assigned regularly, some out of the textbook chapters, to help students learn the course materials better.

Prior to an assignment deadline, the TA will hold a tutorial session (in TB 240 or via Zoom), open to anyone in the class, during the scheduled student hour (6:05 pm – 6:55 pm) on Monday.

If you do not complete the assignments and receive TA feedback, the midterm tests and final exam can become very challenging.

Grade Breakdown:

COMPONENT	GRADE VALUE	DATE
ASSIGNMENTS	4@2.5%	
MIDTERM TESTS	2@15%	
FINAL EXAM	30%	
LAB	30%	

Please note that the midterm tests and final examination in this course will use a remote proctoring service provided by Scheduling and Examination Services. You can find more information at https://carleton.ca/ses/e-proctoring/.

All the assignments, midterm tests, exam, and labs are mandatory, and each marking scheme is the same for everyone. Bell curving will not be used during the course.

Late and Missed Work Policies

Late Work

Late assignments are accepted if permission is obtained from the TA/marker beforehand. using the academic considerations form. There will be penalties of 20% for each day after due.

Missed Work

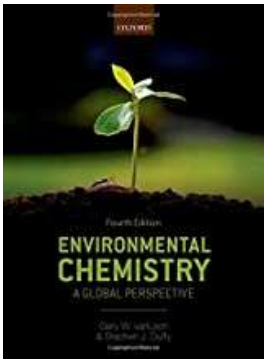
The course policy for missed work is zero marks after 5 days.

The university policy for longer-term (> 5 days) accommodation is detailed at longer-term accommodation .

Learning Material(s) and Other Course/Lab-Related Resources

Learning Material	Options for Purchasing *(e.g. Bookstore, Used, etc.)*	Approximate Cost
Textbook	Bookstore, Amazon, VitalSource, AbeBooks,	$108.99
Lecture slides		Free access via Brightspace
Lab manual		Free access via Brightspace

Textbook:



Environmental Chemistry: A Global Perspective

by Gary W. vanLoon and Stephen J. Duffy | 4th edition | Nov 20 2017. ISBN 9780192522634

Students are required to purchase the textbook for reading and learning in this course. There are no restrictions that would prevent students from using a second-hand copy of the textbook (4th edition). Previous editions are not usable due to out-of-date information, different page numbers, and missing end-of-chapter problems/questions.

- Amazon: available now for CAD 108.99 while supplies last: https://www.amazon.ca/Environmental-Chemistry-Perspective-Gary-vanLoon/dp/019874997X

- Carleton University Bookstore: https://www.bkstr.com/carletonstore/home

- VitalSource: CAD 72.99 https://www.vitalsource.com/en-ca/products/environmental-chemistry-gary-w-vanloon-stephen-j-v9780192522634?gad_source=4&gclid=CjwKCAiApY-7BhBjEiwAQMrrESoQlqyZ2RhQl6c6LjJNWYApqlQPWN25RLbXvT23P9rdG8J9kvq66xoCzuIQAvD_BwE

- AbeBooks: Buy used, USD 51.71 https://www.abebooks.com/servlet/BookDetailsPL?bi=31296791103&dest=can

- Redshelf: Students can follow the link below to pay USD 55.99 for 180-day digital rental, including built-in study tools (highlights, study guides, annotations, definitions, flashcards, and collaboration): https://redshelf.com/book/1062565/environmental-chemistry-1062565-9780192522634-gary-w-vanloon-stephen-j-duffy

Academic Accommodations and Regulations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website (https://students.carleton.ca/course-outline/).

Prohibition on Chat GPT/Generative AI usage for academic credits

Students may not use artificial intelligence tools such as ChatGPT when the assignment/midterm/exam instructions say it is not permitted. As our understanding of the uses of AI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of AI with the TA or course instructor to ensure it supports the learning goals for the course.

Academic Integrity

Students are expected to uphold the values of academic integrity, which include fairness, honesty, trust, and responsibility. Examples of actions that that compromise these values include but are not limited to plagiarism, accessing unauthorized sites/sources for assignments or tests, unauthorized collaboration during midterm tests or final exam.

Students are expected to familiarize themselves with and abide by Carleton University's Academic Integrity Policy. Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of Science can be found here. Additional details about this process can be found on the Faculty of Science Academic Integrity website.

Student Rights & Responsibilities

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

Mental Health and Wellness:

As a student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. For more information, please consult https://wellness.carleton.ca/.

Student Concerns

If a concern arises regarding this course, **your first point of contact is me**: Email or drop in during student hours and I will do my best to address your concern. If I am unable to address your concern, the next points of contact are (in this order):

Note: You can also bring your concerns to Ombuds services.

Assistance for Students

Writing and Learning Support: https://carleton.ca/csas/support/
Peer Assisted Study Sessions (PASS): https://carleton.ca/csas/pass/
Math Tutorial Centre: https://carleton.ca/math/math-tutorial-centre/
Science Student Success Centre: https://sssc.carleton.ca/